

Appl. No 10/743, 641
Amdt. Dated April 13, 2007
Reply to Office action of December 13, 2006

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (original): A brazing strip or foil comprising:
a first metallic layer;
a second metallic layer; and
a core including one or both of titanium and zirconium sandwiched between said first and said second metallic layers, wherein said core has a metallic bond with said first and said second metallic layers formed by roll bonding said core with said layers without any intermediate heat treating.

Claim 2 (original): The brazing strip or foil of claim 1, wherein said first metallic layer is one of commercially pure copper and a copper alloy.

Claim 3 (original): The brazing strip or foil of claim 2, wherein said second metallic layer is one of commercially pure copper and a copper alloy.

Claim 4 (original): The brazing strip or foil of claim 1, wherein said first metallic layer is one of commercially pure nickel and a nickel alloy.

Claim 5 (original): The brazing strip or foil of claim 4, wherein said second metallic layer is one of commercially pure nickel and a nickel alloy.

Claim 6 (original): The brazing strip or foil of claim 1, wherein said first metallic layer is one of commercially pure copper and a copper alloy, and further wherein said second metallic layer is one of commercially pure nickel and a nickel alloy.

Claim 7 (original): The brazing strip or foil of claim 1, wherein one of said first and said second metallic layers is commercially pure copper.

Claim 8 (original): The brazing strip or foil of claim 7, wherein the other of said first and said second metallic layers is of commercially pure copper.

Claim 9 (original): The brazing strip or foil of claim 7, wherein the other of said first and said second metallic layers is one of nickel and a nickel alloy.

Claim 10 (original): A self-brazing composite comprising the brazing strip or foil of claim 1, which is metallurgically bonded to an additional alloy strip to form a self-brazing material.

Claim 11 (original): A brazing strip or foil comprising:

a first layer including one of commercially pure copper, a copper alloy, commercially pure nickel, and a nickel alloy;

a second layer including one of commercially pure copper, a copper alloy, commercially pure nickel, and a nickel alloy; and

a core including one or both of titanium and zirconium sandwiched between said first and said second layers, wherein said core has a metallic bond with said first and said second layers formed by roll bonding said core with said layers without any intermediate heat treating.

Claim 12 (previously presented): A self-brazing composite comprising the brazing strip or foil of claim 11, further comprising an additional alloy strip roll bonded to one of said first or second layers to form a self-brazing material.

Claim 13 (original): The brazing strip or foil of claim 11 wherein a thickness of said strip or foil is reduced by cold rolling without any intermediate heat treating.

Claim 14 (original): A strip or foil comprising:

a first layer including one of commercially pure copper, a copper alloy, commercially pure nickel, and a nickel alloy;

a second layer including one of commercially pure copper, a copper alloy, commercially pure nickel, and a nickel alloy; and

a core including zirconium sandwiched between said first and said second layers, wherein said core has a metallic bond with said first and said second layers formed by roll bonding said core with said layers without any intermediate heat treating.

Claim 15 (previously presented): A self-brazing composite comprising the strip or foil of claim 14, further comprising an additional alloy strip roll bonded to one of said first or second layers to form a self-brazing material.

Claim 16 (currently amended): The brazing strip or foil of claim 11, wherein a thickness of said strip or foil is reduced by said ~~cold-rolling~~ roll bonding without any intermediate heat treating.

Claim 17 (original): A seven layer brazing strip or foil comprising:
a core including one or both of titanium or zirconium sandwiched between a pair of strips or foils each as defined in claim 14, wherein said core has a metallic bond with one surface of each of said pair of strips or foils.

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Claim 18 (original): The brazing strip or foil of claim 17, wherein said metallic bond of said core is formed by roll bonding without any intermediate heat treating.

Claim 19 (original): A brazing strip or foil comprising:
a first metallic layer;
a second metallic layer;
a third metallic layer;
a fourth metallic layer, and
a titanium layer including titanium, with said first and said second layers layered on one side of said titanium layer, and said third and said fourth layers layered on another side of said titanium layer.

Claim 20 (original): The brazing strip or foil of claim 19, wherein at least one of said first, said second, said third, and said fourth metallic layers is of commercially pure copper.

Claim 21 (original): The brazing strip or foil of claim 19, wherein at least one of said first, said second, said third, and said fourth metallic layers is of commercially pure nickel.

Claim 22 (original): The brazing strip or foil of claim 19, wherein one of said first metallic layer and said second metallic layer includes one of copper, a copper alloy, nickel, and a nickel alloy, and further wherein one of said third metallic layer and said fourth metallic layer includes one of copper, a copper alloy, nickel, and a nickel alloy.

Claim 23 (original): The brazing strip or foil of claim 19, wherein said first metallic layer includes one of copper, a copper alloy, nickel, and a nickel alloy, and wherein said second metallic layer includes one of copper, a copper alloy, nickel, and a nickel alloy, and further wherein said third metallic layer includes one of copper, a copper alloy, nickel, and a nickel alloy, and still further wherein said fourth metallic layer includes one of copper, a copper alloy, nickel, and a nickel alloy.

Claim 24 (original): The brazing strip or foil of claim 23, wherein at least one of said metallic layers has a metallurgical bond with said titanium layer formed by roll bonding without any intermediate heat treating.

Claim 25 (original): The brazing strip or foil of claim 19, wherein at least one of said metallic layers has a metallurgical bond with said titanium layer formed by roll bonding without intermediate heat treating.

Claim 26 (currently amended): The brazing strip or foil of claim 19, wherein each of said metallic layers has a metallurgical bond with any adjacent metallic layer or titanium layer, said metallic bond being formed by roll bonding without intermediate heat treating.

Claim 27 (original): The brazing strip or foil of claim 19, wherein one of said first and said second metallic layers includes one of copper and a copper alloy, and wherein the other of said first and said second metallic layers includes one of nickel and a nickel alloy, and further wherein one of said third and said fourth metallic layers includes one of copper and a copper alloy, and still further wherein the other of said third and said fourth metallic layers includes one of nickel and a nickel alloy.

Claim 28 (original): The brazing strip or foil of claim 27, wherein at least one of said metallic layers has a metallurgical bond with said titanium layer formed by roll bonding without intermediate heat treating.

Claim 29 (original): The brazing strip or foil of claim 19, wherein a thickness of said strip or foil is reduced by cold rolling without intermediate heat treating.

Claim 30 (original): A brazing strip or foil comprising:
a first layer including one of copper and a copper alloy;
a second layer including one of nickel and a nickel alloy;
a third layer including one of nickel and a nickel alloy;
a fourth layer including one of copper and a copper alloy; and
a titanium layer of one of commercially pure titanium and a titanium alloy with said first and said second layers layered on one side of said titanium layer, and said third and said fourth layers layered on another side of said titanium layer, wherein said titanium layer has a metallic bond with at least one of said first, said second, said third, and said fourth layers, said metallic bond formed by roll bonding without intermediate heat treating.

Claim 31 (previously amended): The brazing strip or foil of claim 30, wherein said first layer and said fourth layer are comprised of about 0.030" thick commercially pure copper before rolling and further wherein said second layer and said third layer are comprised of about 0.030" thick commercially pure nickel strips before rolling.

Claim 32 (previously amended): The brazing strip or foil of claim 31, wherein said first layer is roll bonded to said second layer and then cold rolled to about 0.012" thick.

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Claim 33 (original): The brazing strip or foil of claim 30, wherein the weight percentage of the resulting brazing strip or foil results in about a 15Cu-15Ni-70Ti alloy upon brazing.

Claim 34 (previously presented): A brazing strip or foil comprising:
a core including of one or both of titanium and zirconium; and
a covering layer of one of commercially pure copper, a copper alloy, commercially pure nickel, and a nickel alloy, said covering layer substantially covering said core, wherein said covering layer has a metallic bond with said core formed by roll bonding without heat treating.

Claim 35 (previously presented): The brazing strip or foil of claim 34 further comprising:
at least one additional covering layer of one of commercially pure copper, a copper alloy; commercially pure nickel, and a nickel alloy.

Claim 36 (original): The brazing strip or foil of claim 35, wherein said covering layer has a metallurgical bond with said additional covering layer formed by roll bonding without any intermediate heat treating.

Claim 37 (original): A brazing strip or foil comprising:

- a first metallic layer;
- a second metallic layer;
- a third metallic layer;
- a fourth metallic layer;
- a fifth metallic layer;
- a sixth metallic layer, and

a core including one or both of titanium and zirconium, said first, second, and third layers layered on one side of said core, and said fourth, fifth, and sixth layers layered on another side of said core.

Claim 38 (original): The brazing strip or foil of claim 37, wherein at least one of said layers is of commercially pure copper.

Claim 39 (original): The brazing strip or foil of claim 37, wherein one or more of said first metallic layer, said second metallic layer, and said third metallic layer includes one or more of zirconium, copper, and nickel, and further wherein one or more of said fourth metallic layer, said fifth metallic layer, and said sixth metallic layer includes one or more of zirconium, copper, and nickel.

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Claim 40 (original): The brazing strip or foil of claim 39, wherein said second metallic layer includes zirconium and is sandwiched between said first metallic layer and said third metallic layer.

Claim 41 (previously presented): The brazing strip or foil of claim 40, wherein said second metallic layer has a metallic bond with both said first and said third metallic layers, said metallic bond formed by roll bonding said first, second, and third layers together without heat treating prior to assembly of the brazing strip or foil.

Claim 42 (original): The brazing strip or foil of claim 37, wherein said second and fifth metallic layers include zirconium, and wherein said first metallic layer ~~includes~~ is made from one of a group consisting of copper and nickel and said third metallic layer ~~includes~~ is made from the other of the group consisting of copper and nickel; and further wherein said fourth metallic layer ~~includes~~ is made from one of a group consisting of copper and nickel and said sixth metallic layer ~~includes~~ is made from the other of the group consisting of copper and nickel.

Claim 43 (original): The brazing strip or foil of claim 42, wherein said core has a metallic bond with said third and said fourth metallic layers formed by roll bonding without intermediate heat treating.

Claim 44 (previously presented): The brazing strip or foil of claim 43, wherein
said second metallic layer has a metallic bond with said first and third metallic layers and
wherein
said fifth metallic layer has a metallic bond with said fourth and sixth metallic layers, and
further wherein
said metallic bonds are formed by roll bonding without intermediate heat treating.

Claim 45 (previously presented): A brazing strip or foil comprising:
a first layer including one or both of nickel and copper;
a second layer including one or both of titanium and zirconium;
a third layer including one or both of nickel and copper;
a fourth layer including one or both of nickel and copper;
a fifth layer including one or both of titanium and zirconium;
a sixth layer including one or both of nickel and copper, and

a core including one of titanium and zirconium, wherein said core is in a middle of said layers.

Claim 46 (previously presented): The brazing strip or foil of claim 45, wherein each of said layers has a metallic bond with any adjacent layer including said core, said metallic bond formed by roll bonding without intermediate heat treating.

Claim 47 (previously presented): The brazing strip or foil of claim 45, wherein the weight percentage of the resulting brazing strip or foil results in about a 20Cu-20Ni-20Zr-40Ti alloy upon brazing.

Claim 48 (previously presented): The brazing strip or foil of claim 45, wherein the weight percentage of the resulting brazing strip or foil results in about a 15Cu-10Ni-37Zr-38Ti alloy upon brazing.

Claim 49 (previously presented): A brazing strip or foil comprising:
a first layer including one or both of nickel and copper;
a second layer including zirconium;
a third layer including one or both of nickel and copper;
a fourth layer including one or both of nickel and copper;

a fifth layer including zirconium;

a sixth layer including one or both of nickel and copper, and a core layer including titanium layered in the center of said strip or foil, wherein

said second layer has a metallic bond with both said first and said third layers, and wherein

said core layer has a metallic bond with both said third and said fourth layers, and further wherein

said fifth layer has a metallic bond with both said fourth and said sixth layers, and still further wherein

said metallic bonds are all formed by roll bonding without heat treating.

Claim 50 (previously presented): The brazing foil or strip of claim 49, wherein said first and sixth layers are of commercially pure copper.

Claim 51 (previously presented): The brazing strip or foil of claim 49, wherein the weight percentage of the resulting brazing strip or foil results in about a 20Cu-20Ni-20Zr-40Ti alloy upon brazing.

Claim 52 (previously presented): The brazing strip or foil of claim 49, wherein the weight percentage of the resulting brazing strip or foil results in about a 15Cu-10Ni-37Zr-38Ti alloy upon brazing.

Claim 53 (previously presented): A method of making a seven layer composite strip comprising the steps of:

- providing a first strip including one or both of nickel and copper;
- providing a second strip including one or both of zirconium and titanium;
- providing a third strip including one or both of nickel or copper;
- first roll bonding said first strip, said second strip and said third strip together to form a metallic bond between said first strip and said second strip and to form a metallic bond between said second strip and said third strip to form an outer composite strip;
- providing a core including one or both of titanium and zirconium; and
- second roll bonding said core with a layer of said outer composite strip on each side of said core to form a metallic bond between said core and each of said outer composite strips to thereby form a seven layer composite strip.

Claim 54 (previously presented): The method of claim 53 wherein said first roll bonding step is accomplished without any intermediate heat treating step.

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Claim 55 (previously presented): The method of claim 54 wherein said second roll bonding step is also accomplished without any intermediate heat treating step.